

BAB V

KESIMPULAN DAN SARAN

V.1. Kesimpulan

Kesimpulan dari penelitian ini adalah:

1. *Physisorption* dan multilayer (heterogen) terjadi dalam mekanisme adsorpsi hidrogel selulosa dan hidrogel selulosa/TiO₂ terhadap metilen biru karena *physisorption* memiliki nilai energi Gibbs kurang dari 40kJ/mol, juga karena multilayer (heterogen) dapat dilihat dari nilai n pada persamaan isoterm Sips yang tidak mendekati nol. Model kinetika juga memperkuat bukti *physisorption* adanya interaksi dua reaktan yang mengalami perubahan jumlah kuantitatif yaitu air dan metilen biru yang menjadi penyebab terbentuknya lapisan multilayer di sekitar permukaan hidrogel selulosa dan hidrogel selulosa/TiO₂.
2. Peningkatan massa selulosa dalam menyiapkan hidrogel menghasilkan hidrogel dengan *water retention* yang tinggi.
3. Persamaan isoterm adsorpsi paling cocok untuk hidrogel selulosa adalah persamaan Sips namun cenderung mendekati Langmuir.
4. Model kinetika untuk hidrogel selulosa dan hidrogel selulosa/TiO₂ adalah pseudo second order. Akan tetapi data tersebut perlu diulang kembali secara teliti untuk membuktikan kinetika reaksi yang benar karena R^2 yang diperoleh rendah.
5. Parameter termodinamika reaksi adsorpsi menggunakan hidrogel selulosa yaitu entalpi dan entropi berturut-turut adalah eksotermis dan keacakan berkurang seiring suhu dengan energi Gibbs menunjukkan reaksi kurang spontan di suhu tinggi. Parameter termodinamika reaksi adsorpsi menggunakan hidrogel selulosa/TiO₂ yaitu entalpi dan entropi berturut-turut adalah endotermis dan

keacakan berkurang pada hidrogel selulosa dan keacakan bertambah pada hidrogel selulosa/TiO₂. Seiring suhu dengan energi Gibbs menunjukkan reaksi kurang spontan di suhu tinggi.

V.2. Saran

Penelitian aplikasi hidrogel dalam pengolahan limbah air perlu dilakukan lebih lanjut. Karakteristik hidrogel yang memiliki pori dan menyerupai jaring menjadi keistimewaan hidrogel sebagai adsorben, sehingga metode pembuatan hidrogel perlu dilakukan lebih lanjut. Perlu diteliti lebih lanjut terhadap jenis pewarna dan limbah ion logam lainnya karena karakteristik permukaannya dengan pH_{PZC} 7,35 yang cocok untuk mengikat anion ataupun kation.

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